fixed alkalies," because they do not evaporate when exposed to a very high temperature, and also to distinguish them from the alkali *ammonia*, which readily evaporates even at common temperatures.

The first of these fixed alkalies was formerly called *potash*, from the circumstance of its being yielded by the combustion of vegetable matters in iron cauldrons or pots. The name is now modified into *potassa*, to harmonize with chemical nomenclature. The second of these fixed alkalies was, and is still, called *soda*, on account of its being yielded by the combustion of a marine plant, called *salsola soda*. The volatile alkali was called *ammonia*, from being found in *sal ammoniac*, a substance first discovered in the vicinity of the Temple of Jupiter Ammon, in Upper Egypt. The word *alkali* is of Arabic origin, and implying *of* or *from a plant*.

From the early ages in which potassa and soda were known until the year 1807, they were regarded as elements; but Sir Humphry Davy found that they could be decomposed by voltaic electricity, that they yielded oxygen and inflammable *metals*, which he named *potassium* and *sodium*, so that the fixed alkalies are true *metallic oxides*.

They are both solid substances, perfectly white, exceedingly caustic and corrosive,—far more so than lime; they dissolve perfectly in water, and change the yellow colour of turmeric root to a deep brown. Either of these alkalies, heated with silica, will yield glass; but they are rarely, if ever, used in a pure or caustic state by the manufacturer of glass on account of their great expense; he employs them as *carbonates* of potassa or soda, and these are well known as common "pearlash" and common "soda."

When mixed in due proportion with sand, and heated in the glass-house furnace, the silica enacts the part of an *acid*, expelling the carbonic acid, taking its place, and producing, with the resulting potassa or soda, a *silicate of potassa or soda*.

In the manufacture of "crown" and "plate-glass" soda is the alkali used, whilst for that of "flint-glass" potassa is most commonly employed; but this glass has an addition of a certain quantity of *oxide of lead*, more familiarly known as "litharge," which has the property of uniting with the silica and the potassa; so, whilst "crown" and "plate" may be chemically regarded as almost pure *silicates of soda*, "flint-glass" is a *silicate of potassa and lead*.

In glass, then, soda or potassa are present, which, in their pure states, are readily soluble in water, and change the yellow colour of turmeric to brown; but, as combined with silica, or with it and oxide of lead, having no such properties, so remarkable are the changes effected upon substances when they are caused to exert chemical affinity for each other, and are also compactly bound together by attraction of aggregation.

If this attraction of aggregation be overcome, as by reducing a portion of glass to an extremely fine powder, and then placing it upon a piece of paper, stained yellow with turmeric, the addition of water will dissolve out a portion of the alkali, and it will turn the paper brown: chemical affinity between the water and the alkali being promoted by diminishing attraction of aggregation.

In some glass there is a very great excess of alkali; and therefore it is extremely prone to decay, or to become dull, even in the solid form of a sheet or plate, by long continued exposure to water.

The ancients appear to have added a larger quantity of alkali than that absolutely required for the vitrification of the sand; for upon the examination of a specimen of ancient glass, it was found beautifully transparent, but always damp, and it even yielded alkaline indications to the turmeric paper without requiring reduction to powder: it was a silicate of potassa with excess of potassa, this being probably added to assist the fusion.

In museums we very frequently find specimens of ancient glass deeply corroded, and their surfaces covered with a beautiful iridescent film; time having allowed moisture to effect its work on the solid though highly alkaline material, the alkali having been partly abstracted, the film of insoluble silica remaining.

VENTILATION AT THE HOUSE OF LORDS.

On Friday last, Professor Faraday delivered a lecture at the Royal Institution, descriptive of the method of ventilating the new House of Lords. He stated, that his opinion had been asked by the Government upon the plan, the merit of which was entirely due to Mr. Barry, and said, that in the account he was about to give, he should make no comparison between this plan, and that of any other individual.—Nothing was more easy in theory than ventilation, and nothing more difficult in practice. Place 100 persons in an apartment well-ventilated, under the most favourable circumstances, and it would be impossible to please them all. In the present instance, he could merely tell them what the architect expected would be the mode of action, the opinion being, he believed, founded on sound views. He shewed from drawings and models, that the House of Lords and its adjuncts, consisted mainly of three divisions; the House itself, with the throne at one end and strangers' gallery at the other; the lobby at one end of the House, and the Victoria Hall at the other. The approximate dimensions of the House might be stated at 90 feet long, 45 feet wide, and 45 feet high. The carcase was entirely fire-proof, and this condition of the structure it had been necessary not to interfere with. The points to which attention had been directed, were:—To supply a certain degree of warmth through an impervious floor; to produce a current of air which should not be sensible, and which there were means of influencing the temperature of, and to change the air as completely, as required by previously ascertained *data*. The apertures for entrance and exit of air were both in the ceiling, those for admission being along each side, and those for exit being along the middle, the motive power, and the principle of the circulation, having to be explained.

The principal heating apparatus was a steam boiler, on the plan of Lord Dundonald, placed in the basement, under the flue of exit, which boiler also supplied a steam jet, issuing in the flue with sufficient force to draw the air after it. The principal steam-pipe communicated with several cokels, placed at the point where the air gained admission, and where after having passed through perforated zinc, over which water was constantly trickling, in order to free it as much as possible from soot and impurities—it was heated, and passed immediately under the floor, along the whole length of the house: this floor being formed of perforated plates covered by thinner plates of metal. It would then ascend flues at the angles of the Victoria Hall, communicating with horizontal flues and chambers above the ceiling, where it gained admission to the house, through perforations in the ribs of the panelling. Now the principle of the circulation within the house, on which great confidence had been placed, was this:—The air being admitted at the sides, at two divisions of the three, into which the ventilating arrangement above the ceiling was divided; the upper part of the walls being occupied by windows, and both sides of the house being exactly similar; it was expected, that the air would have a tendency to descend down each side, to the floor, when the two currents would unite in the centre, and re-ascend to the ceiling, being then drawn out by the motive power. The lecturer shewed several experiments, tending to prove that this circulation would take place, and the expectation had in a great measure, been confirmed by a trial in the building. Some pastile powder was burnt within the range of the current, before its admission to the house, and the scent of this pastile powder was perceptible through all stages of the course, reaching the final exit flue in fifteen minutes. But this was not all, for this powder being burnt, only in the current which gained admission at one side of the house, the scent was perceptible at one side, but not at the other; and he, the professor, had walked across the house in every part of the length, and had always found, that the scent was perceptible at one side only. He found, that the aromatized atmosphere commenced somewhere about the centre, thus proving most clearly to his mind, the correctness of the reasoning, on which Mr. Barry had proceeded. He had further been led to approve of this plan, from the extreme care which the architect had taken, in providing for the different seasons of the year, and extraordinary influences. Other apertures of ingress had been provided under the galleries, which could be made use of as occasion might require; the section of the passage being in all cases so large, that there could be no sensible current. Provision had also been made for cooling the air, by passing the piping through water obtained at the Houses of Parliament from the wells in Trafalgar Square, which had been found to be at the temperature of 45 deg. even in summer, and with which the cokels were filled, in place of steam.

The professor then exhibited the mode of action of the steam jet, the motive power before mentioned, shewing, by means of flame and by the vapour of gunpowder, how, when issuing within a larger tube, it would draw the air after it from a considerable distance.

He said he had great confidence in the result of the plan, and he proceeded to recapitulate what was expected from it. It was hoped, that there would be an absence of any perceptible drafts; also that the walls would be free from being discoloured by these causes, which frequently made one side of a room appear darker than another. There would further, it was hoped, be no tendency to movement of dust in the house; that all sudden changes would be avoided; and lastly, there was the certainty, that the building would be fire-proof. He concluded by apologizing to his hearers, and to the architect, for the imperfect description which he had been able to give, and by stating, that whatever be the opinion as to the numerous other schemes, which had been suggested, it ought in justice to the architect to be stated, that he had to take a building planned for another mode of ventilation, and not for his own.

As the success of the scheme above described, is so soon to receive a complete trial, it would be prudent to postpone any remark upon it; but the opinion of Professor Faraday cannot but be considered as satisfactory to our professional readers, proving, as it does, how inadvisable is any interference with the complete control of an architect, over his own work. Should, as it seems probable, the result be successful, it will prove most clearly the foundation for the views, long ago expressed by us, as to the ventilating arrangements, in connection with the architect's duty as the designer of a building. We have always argued, that any interference with the duties of an architect is inadvisable, unless it can be clearly shewn, that the advice of another party would benefit him; and even should the present scheme fail, the opinion given in favour of it now, would shew, that there are no grounds for assuming, that any individuals know the duties of an architect better than he does. But this mishap we have now no expectation of, and we hope that the details will be published, in a more complete form than we have had it in our power to give them in this notice of the lecture.*

AWARDS OF THE OFFICIAL REFEREES.

STONE HEARTHS FOR COPPERS.

Mr. Parker, of Greenwich, having set some coppers with hearths in some cases 9 inches and in others 12 inches wide, the district surveyor gave him notice of irregularity,—"The hearths in front of chimney-openings to coppers now fixed not being at the least 18 inches in front of the arch over the same, contrary to schedule F.;" and the same not being amended, he took the case to the referees.

The builder contended there were no regulations in the Act relative to furnaces for coppers.

The referees determined that the furnace-opening to a copper is a chimney-opening within the meaning of the Metropolitan Buildings Act, and as it regarded the matter in question, that the slabs or outer hearths before the furnace-openings of the coppers were not

* In the library of the Institution, a copy of Mr. Foley's statue of Innocence, reduced by Cheverton's machine for the Art-Union of London, was exhibited. Drawings explanatory of several schemes of ventilating rooms, and also the public sewers by means of pipes passing up the fronts of the adjoining houses, and communicating with the chimneys, were exhibited by Mr. and Mrs. Varley. Amongst other objects of interest was a MS. work on the Coliseum, copiously illustrated with elaborate drawings of every part of the building, taken at the time of the excavations by the French during the years 1811, 1812, and 1813. We could not avoid regretting, that so careful an examination had never been published, or that this work did not form part of the collection at the British Museum. It was contributed by Mr. G. Walford.